CLAIMS:

1. A combination, comprising:

(a) an addressable collection of capture agents;

(b) a plurality of sets of binding partners, wherein each set of binding partners specifically binds to a unique capture agent; and

(c) either or both of:

one or more conjugation reagents, wherein the reagent effects covalent linkage of a binding partner to a displayed molecule and/or displayed biological particle; and/or

instructions for use of the addressable collection of capture agents and binding partners to prepare self-assembled arrays.

2. The combination of claim 1, where the number of different sets of binding partners is equal to the number of unique capture agents.

3. The combination of claim 1, wherein the capture agents comprise antibodies.

4. The combination of claim 3, wherein the antibodies are monoclonal antibodies or fragments thereof that retain the ability to specifically bind to a binding partner.

5. The combination of claim 1, wherein the binding partners comprise polypeptides.

6. The combination of claim 1, comprising one or more conjugation reagents, wherein the reagent effects covalent linkage of a binding partner to a molecule or biological particle.

7. The combination of claim 6, wherein the covalent linkage further comprises a linker between the binding partner and the molecule and/or biological particle.

8. The combination of claim 7, wherein the linker is a peptide linker, a chemical linker, or a cleavable linker.

9. The combination of claim 8, wherein the cleavable linker is selected from the group consisting of acid-cleavable, heat labile and photocleavable linkers.

10. The combination of claim 7, wherein the linkage comprises an intermediate molecule.

11. The combination of claim 10, wherein the intermediate molecule is a bead.

12. The combination of claim 11, wherein the bead is linked to an electronic, chemical, optical, or color-coded label.

13. The combination of claim 1, wherein:

the capture agents comprise polyclonal antibodies;

the collection is addressed as loci on a solid support; and

each locus on the solid support comprises polyclonal antibodies specific for one binding partner.

14. The combination of claim 13, wherein the avidity of the polyclonal antibodies for the binding partner at each locus is about 10^8 - 10^{12}.

15. The combination of claim 1, wherein the capture agents and/or binding partners comprise scFvs.

16. The combination of claim 15, wherein the capture agents comprise scFvs.

17. The combination of claim 1, wherein the addressable collection is positionally addressable; and

each address comprises a spot on a solid support.

18. The combination of claim 17 that is a array.

19. The combination of claim 17, wherein the solid support is selected from the group consisting of silicon, cellulose, metal, polymeric surfaces and radiation grafted supports.

20. The combination of claim 17, wherein the solid support is selected from the group consisting of gold, nitrocellulose, polyvinyldiene fluoride (PVDF), radiation grafted polytetrafluoroethylene, polystyrene, glass and activated glass.

21. The combination of claim 17, wherein the solid support comprises a well or pit or plurality thereof in a surface of the solid support.

22. The combination of claim 17, wherein the solid support is selected from the group consisting of plates, beads, microbeads, whiskers, combs, hybridization chips, membranes, single crystals, ceramics and self-assembling monolayers.

23. The combination of claim 17, wherein the collections of capture agents are conjugated with biotin or a biotin derivative and the solid support is conjugated with avidin, streptavidin or a derivative thereof, whereby the capture agents are linked to the support.

24. The combination of claim 17, wherein the capture agents are attached to the solid support directly or via a linker by a covalent bond, an electrostatic bond, a hydrogen bond or a combination thereof.

25. The combination of claim 17, wherein one or more capture agents are linked to the solid supports via a linker or linkers.

26. The combination of claim 25, wherein the linker is selected from the group consisting of oligopeptides, oligonucleotides, oligopolyamides, oligoethyleneglycerol, oligoacrylamides, alkyl chains of between about 6 to about 20 carbon atoms, and combinations thereof.

27. The combination of claim 24, wherein the attachment is a cleavable attachment.

28. The combination of claim 27, wherein the cleavable attachment is cleavable by an enzyme, a chemical agent or electromagnetic radiation.

29. The combination of claim 28, wherein the chemical agent is selected from the group consisting of reducing agents, oxidizing agents, hydrolyzing agents and combinations thereof.

30. The combination of claim 28, wherein the electromagnetic radiation is selected from the group consisting of visible, ultraviolet and infrared radiation.

31. The combination of claim 1, wherein the collection of capture agents are addressably tagged by linking them to electronic, chemical, optical or color-coded labels.

32. The combination of claim 6, wherein the covalent linkage effected by the conjugation reagent is selected from the group consisting of thiol-thiol, thiol-amine, amine-amine, amine-carboxylic acid, thiol-carboxylic acid, thiol-carbohydrate and amine-non selective linkage.

33. The combination of claim 1, further comprising a computer readable medium containing pattern recognition software.

34. A kit comprising the combination of claim 1 and one or more of the following:

(a) packaging material; and

(b) instructions for using the kit for preparation, use and/or analysis of self-assembled arrays.

35. A combination, comprising:

an addressable collection of capture agents; and

a list setting forth the amino acid sequences that comprise the binding portion of polypeptide binding partners for each member of the collection of capture agents or setting forth sequences of nucleotides that encode the sequences of amino acids of binding partners that specifically bind to each member of the collection of capture agents.

36. The combination of claim 35, further comprising:

one or more conjugation reagents, wherein the reagent effects covalent linkage of a binding partner to a displayed molecule or displayed biological particle.

37. The combination of claim 35, wherein the capture agents comprise antibodies.

38. The combination of claim 37, wherein the antibodies are monoclonal antibodies or fragments thereof that retain the ability to specifically bind to a binding partner.

39. The combination of claim 35, wherein:

the capture agents comprise polyclonal antibodies;

the collection is addressed as loci on a solid support; and

each locus on the solid support comprises polyclonal antibodies specific for one binding partner.

40. The combination of claim 39, wherein the avidity of the polyclonal antibodies for the binding partner at each locus is about 10^8 - 10^{12}.

41. The combination of claim 35, wherein the capture agents and/or binding partners comprise scFvs.

42. The combination of claim 37, wherein the antibodies comprise an antibody fragment that comprises a scFv.

43. The combination of claim 35, wherein polypeptide binding partners are selected from the group consisting of an E-tag polypeptide (SEQ ID No. 1), a FLAG polypeptide (SEQ ID No. 2), a Glu-Glu polypeptide (SEQ ID No. 3), a HA.11 polypeptide (SEQ ID No. 4), a HSV-tag polypeptide (SEQ ID No. 5), a c-myc polypeptide (SEQ ID No. 6), a T7 tag polypeptide (SEQ ID No. 7), a VSV-G polypeptide (SEQ ID No. 8), a V5 polypeptide (SEQ ID No. 9), an AB2 polypeptide (SEQ ID No. 10), an AB4 polypeptide (SEQ ID No. 11), a B34 polypeptide (SEQ ID No. 12), a P5D4-A polypeptide (SEQ ID No. 13), a P5D4-B polypeptide (SEQ ID No. 14), a 4C10 polypeptide (SEQ ID No. 15), an AB3 polypeptide (SEQ ID No. 16), an AB6 polypeptide (SEQ ID No. 17), a KT3-A polypeptide (SEQ ID No. 18), a KT3-B polypeptide (SEQ ID No. 19), a KT3-C polypeptide (SEQ ID No. 20), a 7.23 polypeptide (SEQ ID No. 21), a HOPC1 polypeptide (SEQ ID No. 22), a s1 polypeptide (SEQ ID No. 23), an E2 polypeptide (SEQ ID No. 24), a His tag polypeptide (SEQ ID No. 25), an AU1 polypeptide (SEQ ID No. 26), an AU5 polypeptide (SEQ ID No. 27), an IRS polypeptide (SEQ ID No. 28), a KT3 polypeptide (SEQ ID No. 34), NusA (SEQ ID No. 29), Maltose binding protein (SEQ ID No. 30), TATA-box binding protein (SEQ ID No. 31) and thioredoxin (SEQ ID No. 32).

44. The combination of claim 35, wherein a sequence of nucleotides encodes a polypeptide selected from the group consisting of an E-tag polypeptide (SEQ ID No. 1), a FLAG polypeptide (SEQ ID No. 2), a Glu-Glu polypeptide (SEQ ID No. 3), a HA.11 polypeptide (SEQ ID No. 4), a HSV-tag polypeptide (SEQ ID No. 5), a c-myc polypeptide (SEQ ID No. 6), a T7 tag polypeptide (SEQ ID No. 7), a VSV-G polypeptide (SEQ ID No. 8), a V5 polypeptide (SEQ ID No. 9), an AB2 polypeptide (SEQ ID No. 10), an AB4 polypeptide (SEQ ID No. 11), a B34 polypeptide (SEQ ID No. 12), a P5D4-A polypeptide (SEQ ID No. 13), a P5D4-B polypeptide (SEQ ID No. 14), a 4C10 polypeptide (SEQ ID No. 15), an AB3 polypeptide (SEQ ID No. 16), an AB6 polypeptide (SEQ ID No. 17), a KT3-A polypeptide (SEQ ID No. 18), a KT3-B polypeptide (SEQ ID No. 19), a KT3-C polypeptide (SEQ ID No. 20), a 7.23 polypeptide (SEQ ID No. 21), a HOPC1 polypeptide (SEQ ID No. 22), a S1 polypeptide (SEQ ID No. 23), an E2 polypeptide (SEQ ID No. 24), a His tag polypeptide (SEQ ID No. 25), an AU1 polypeptide (SEQ ID No. 26), an AU5 polypeptide (SEQ ID No. 27), an IRS polypeptide (SEQ ID No. 28), a KT3 polypeptide (SEQ ID No. 34), NusA (SEQ ID No. 29), Maltose binding protein (SEQ ID No. 30), TATA-box binding protein (SEQ ID No. 31) and thioredoxin (SEQ ID No. 32).

45. The combination of claim 35, wherein the addressable collection is positionally addressable; and

each address comprises a spot on a solid support.

46. The combination of claim 45 that is an array.

47. The combination of claim 45, wherein the solid support is selected from the group consisting of silicon, celluloses, metal, polymeric surfaces and radiation grafted supports.

48. The combination of claim 45, wherein the solid support is selected from the group consisting of gold, nitrocellulose, polyvinyldiene fluoride (PVDF), radiation grafted polytetrafluoroethylene (PFTE), polystyrene, glass and activated glass.

49. The combination of claim 45, wherein the solid support comprises a well or pit or plurality thereof in a surface of the solid support.

50. The combination of claim 45, wherein the solid support is selected from the group consisting of plates, beads, microbeads, whiskers, combs, hybridization chips, membranes, single crystals, ceramics and self-assembling monolayers.

51. The combination of claim 45, wherein the collections of capture agents are conjugated to biotin or a biotin derivative and the solid support is conjugated to avidin, streptavidin or a derivative thereof, whereby the capture agents are linked to the solid support.

52. The combination of claim 45, wherein the capture agents are attached to the solid support by a covalent bond, an electrostatic bond, a hydrogen bond or a combination thereof.

53. The combination of claim 45, further comprising a linker between the collections of capture agents and the solid support.

54. The combination of claim 53, wherein the linker is selected from the group consisting of oligopeptides, oligonucleotides, oligopolyamides, oligoethyleneglycerol, oligoacrylamides, alkyl chains of between about 6 to about 20 carbon atoms, and combinations thereof.

55. The combination of claim 52, wherein the attachment is a cleavable attachment.

56. The combination of claim 55, wherein the cleavable attachment is cleavable by an enzyme, a chemical agent or electromagnetic radiation.

57. The combination of claim 56, wherein the chemical agent is selected from the group consisting of reducing agents, oxidizing agents, hydrolyzing agents and combinations thereof.

58. The combination of claim 56, wherein the electromagnetic radiation is selected from the group consisting of visible, ultraviolet and infrared radiation.

59. The combination of claim 35, wherein the collection of capture agents are addressably tagged by linking them to electronic, chemical, optical or color-coded labels.

60. The combination of claim 35, further comprising one or more conjugation reagents, wherein the reagent effects covalent linkage of a binding partner to a molecule or biological particle.

61. The combination of claim 35, further comprising a computer readable medium containing pattern recognition software.

62. A kit comprising a combination of claim 35 and one or more of the following:

(a) packaging material; and

(b) instructions for using the kit for preparation, use and/or analysis of self-assembled arrays.

63. A combination, comprising:

an addressable collection of capture agents;

a collection of sets of nucleic acid molecules, wherein:

the nucleic acid molecules of each set encode all or a portion of a polypeptide binding partner;

the encoded polypeptide binding partner or portion binds to a capture agent; and

one or more conjugation reagent(s) for linking the encoded polypeptides to molecules and/or biological particles.

64. The combination of claim 63, wherein the capture agents comprise antibodies.

65. The combination of claim 64, wherein the antibodies are monoclonal antibodies or fragments thereof that retain the ability to specifically bind to a binding partner.

66. The combination of claim 63, wherein:

the capture agents comprise polyclonal antibodies;

the collection is addressed as loci on a solid support; and

each locus on the solid support comprises polyclonal antibodies specific for one binding partner.

67. The combination of claim 66, wherein the avidity of the polyclonal antibodies for the binding partner at each locus is about 10^8 - 10^{12}.

68. The combination of claim 63, wherein a capture agent and/or binding partner comprise(s) a scFv.

69. The combination of claim 64, wherein an antibody or fragment thereof is an anti-peptide antibody selected from the group consisting of an anti-E-tag antibody, an anti-FLAG M2 antibody, an anti-Glu-Glu antibody, an anti-HA.11 antibody, an anti-HSV-tag antibody, an anti-c-myc antibody, an anti-T7 tag antibody, an anti-VSV G antibody, an anti-V5 antibody, an anti-AB2 antibody, an anti-AB4 antibody, an anti-B34 antibody, an anti-P5D4 A antibody, an anti-P5D4 B antibody, an anti-4C10 antibody, an anti-AB3 antibody, an anti-AB6 antibody, an anti-KT3 A antibody, an anti-KT3 B antibody, an anti-KT3 C antibody, an anti-7.23 antibody, an anti-HOPC1 antibody, an anti-S1 antibody, an anti-E2 antibody, an anti-His tag antibody, an anti-AU1 antibody, an anti-AU5 antibody, an anti-IRS antibody, an anti-NusA antibody, an anti-MBP antibody, an anti-TBP antibody and an anti-TRX antibody.

70. The combination of claim 64, wherein one or more antibodies comprise a fragment that comprises a scFv.

71. The combination of claim 63, wherein a polypeptide binding partner is selected from the group consisting of an E-tag polypeptide (SEQ ID No. 1), a FLAG polypeptide (SEQ ID No. 2), a Glu-Glu polypeptide (SEQ ID No. 3), a HA.11 polypeptide (SEQ ID No. 4), a HSV-tag polypeptide (SEQ ID No. 5), a c-myc polypeptide (SEQ ID No. 6), a T7 tag polypeptide (SEQ ID No. 7), a VSV-G polypeptide (SEQ ID No. 8), a V5 polypeptide (SEQ ID No. 9), an AB2 polypeptide (SEQ ID No. 10), an AB4 polypeptide (SEQ ID No. 11), a B34 polypeptide (SEQ ID No. 12), a P5D4-A polypeptide (SEQ ID No. 13), a P5D4-B polypeptide (SEQ ID No. 14), a

4C10 polypeptide (SEQ ID No. 15), an AB3 polypeptide (SEQ ID No. 16), an AB6 polypeptide (SEQ ID No. 17), a KT3-A polypeptide (SEQ ID No. 18), a KT3-B polypeptide (SEQ ID No. 19), a KT3-C polypeptide (SEQ ID No. 20), a 7.23 polypeptide (SEQ ID No. 21), a HOPC1 polypeptide (SEQ ID No. 22), a s1 polypeptide (SEQ ID No. 23), an E2 polypeptide (SEQ ID No. 24), a His tag polypeptide (SEQ ID No. 25), an AU1 polypeptide (SEQ ID No. 26), an AU5 polypeptide (SEQ ID No. 27), an IRS polypeptide (SEQ ID No. 28), a KT3 polypeptide (SEQ ID No. 34), NusA (SEQ ID No. 29), Maltose binding protein (SEQ ID No. 30), TATA-box binding protein (SEQ ID No. 31) and thioredoxin (SEQ ID No. 32).

72. The combination of claim 63, wherein one or more of the sets of nucleotides encode a polypeptide selected from the group consisting of an E-tag polypeptide (SEQ ID No. 1), a FLAG polypeptide (SEQ ID No. 2), a Glu-Glu polypeptide (SEQ ID No. 3), a HA.11 polypeptide (SEQ ID No. 4), a HSV-tag polypeptide (SEQ ID No. 5), a c-myc polypeptide (SEQ ID No. 6), a T7 tag polypeptide (SEQ ID No. 7), a VSV-G polypeptide (SEQ ID No. 8), a V5 polypeptide (SEQ ID No. 9), an AB2 polypeptide (SEQ ID No. 10), an AB4 polypeptide (SEQ ID No. 11), a B34 polypeptide (SEQ ID No. 12), a P5D4-A polypeptide (SEQ ID No. 13), a P5D4-B polypeptide (SEQ ID No. 14), a 4C10 polypeptide (SEQ ID No. 15), an AB3 polypeptide (SEQ ID No. 16), an AB6 polypeptide (SEQ ID No. 17), a KT3-A polypeptide (SEQ ID No. 18), a KT3-B polypeptide (SEQ ID No. 19), a KT3-C polypeptide (SEQ ID No. 20), a 7.23 polypeptide (SEQ ID No. 21), a HOPC1 polypeptide (SEQ ID No. 22), a S1 polypeptide (SEQ ID No. 23), an E2 polypeptide (SEQ ID No. 24), a His tag polypeptide (SEQ ID No. 25), an AU1 polypeptide (SEQ ID No. 26), an AU5 polypeptide (SEQ ID No. 27), an IRS polypeptide (SEQ ID No. 28), a KT3 polypeptide (SEQ ID No. 34), NusA (SEQ ID No. 29), Maltose binding protein (SEQ ID No. 30), TATA-box binding protein (SEQ ID No. 31) and thioredoxin (SEQ ID No. 32).

73. The combination of claim 63, wherein the addressable collection is positionally addressable; and

each address comprises a spot on an a solid support.

74. The combination of claim 73 that is a array.

75. The combination of claim 73, wherein the solid support is selected from the group consisting of silicon, celluloses, metal, polymeric surfaces and radiation grafted supports.

76. The combination of claim 73, wherein the solid support is selected from the group consisting of gold, nitrocellulose, polyvinyldiene fluoride (PVDF), radiation grafted polytetrafluoroethylene (PFTE), polystyrene, glass and activated glass.

77. The combination of claim 73, wherein the solid support comprises a well or pit or plurality thereof in a surface of the solid support.

78. The combination of claim 73, wherein the solid support is selected from the group consisting of plates, beads, microbeads, whiskers, combs, hybridization chips, membranes, single crystals, ceramics and self-assembling monolayers.

79. The combination of claim 73, wherein the collections of capture agents are conjugated with biotin or a biotin derivative and the solid support is conjugated with avidin, streptavidin or a derivative thereof.

80. The combination of claim 73, wherein the capture agents are attached to the solid support by a covalent bond, an electrostatic bond, a hydrogen bond or a combination thereof.

81. The combination of claim 73, further comprising a linker between the collections of capture agents and the solid support.

82. The combination of claim 81, wherein the linker is selected from the group consisting of oligopeptides, oligonucleotides, oligopolyamides, oligoethyleneglycerol, oligoacrylamides, alkyl chains of between about 6 to about 20 carbon atoms, and combinations thereof.

83. The combination of claim 80, wherein the attachment is a cleavable attachment.

84. The combination of claim 83, wherein the cleavable attachment is cleavable by an enzyme, a chemical agent or electromagnetic radiation.

85. The combination of claim 84, wherein the chemical agent is selected from the group consisting of reducing agents, oxidizing agents, hydrolyzing agents and combinations thereof.

86. The combination of claim 84, wherein the electromagnetic radiation is selected from the group consisting of visible, ultraviolet and infrared radiation.

87. The combination of claim 63, wherein the collection of capture agents are addressably tagged by linking them to electronic, chemical, optical or color-coded labels.

88. The combination of claim 63, wherein the linking effected by the conjugation reagent(s) is selected from the group consisting of thiol-thiol, thiol-amine, amine-amine, amine-carboxylic acid, thiol-carboxylic acid, thiol-carbohydrate and amine-non selective linkage.

89. The combination of claim 63, further comprising a computer readable medium containing pattern recognition software.

90. A kit comprising the combination of claim 63 and one or more of the following:

(a) packaging material; and

(b) instructions for using the kit for preparation, use and/or analysis of self-assembled arrays.

91. A method for preparing a self-assembled array, comprising:

a) providing an addressable array of capture agents that have predetermined binding partners;

b) preparing a plurality of sets of conjugates, wherein:

each set of conjugates comprises a biological particle and/or molecule linked to a binding partner or plurality thereof, wherein the binding partner binds to one of the capture agents in the array; and

c) contacting the addressable array of capture agents with the sets of conjugates to produce the self-assembled array.

92. A method for preparing a self-assembled array, comprising:

a) providing an addressable array of capture agents that have predetermined binding partners;

b) preparing sets of binding partners, wherein a binding partner is a polypeptide encoded by a nucleic acid;

c) preparing a plurality of sets of conjugates, wherein:

each set of conjugates comprises a biological particle and/or molecule linked to a binding partner or plurality thereof from one set of binding partners, wherein the binding partner binds to one of the capture agents in the array; and

d) contacting the addressable array of capture agents with the sets of conjugates to produce the self-assembled array.

93. The method of claim 91, wherein the biological particle and/or molecule is linked to the binding partner by a linker or intermediate molecule.

94. The combination of claim 93, wherein the linker is selected from the group consisting of peptide linker, a chemical linker, and a cleavable linker.

95. The combination of claim 94, wherein the cleavable linker is selected from the group consisting of acid-cleavable, heat labile and photocleavable linkers.

96. The combination of claim 93, wherein the intermediate molecule is a bead.

97. The combination of claim 96, wherein the bead is linked to an electronic, chemical, optical, or color-coded label.

98. The combination of claim 93, wherein the linking of the binding partner to the linker or intermediate molecule comprises a covalent bond, an electrostatic bond, a hydrogen bond, or a combination thereof.

99. The combination of claim 93, wherein a displayed molecule and/or a displayed particle is attached to the linker or intermediate molecule.

100. The combination of claim 99, wherein the attachment of the displayed molecule and/or a displayed particle to the linker or intermediate molecule comprises a covalent bond, an electrostatic bond, a hydrogen bond, or a combination thereof.

101. The method of claim 92, wherein the nucleic acid is synthetically prepared.

102. A method for preparing a self-assembled array, comprising:

a) providing an addressable array of capture agents that have predetermined binding partners;

b) providing a plurality of sets binding partners, wherein each set of binding partners specifically binds to a unique capture agent, and each set of binding partners is separate from each other set; and

c) crosslinking each set of binding partners to molecules and/or biological particles to produce sets of conjugates.

103. A method for preparing a self-assembled array, comprising:

a) providing an addressable array of capture agents that have predetermined binding partners;

b) providing a plurality of sets binding partners, wherein each set of binding partners specifically binds to a unique capture agent, and each set of binding partners is separate from each other set; and

c) linking each set of binding partners to beads to produce sets of binding partner beads.

104. The method of claim 103, further comprising: contacting the sets of binding partner beads with biological particles and/or molecules;

wherein each set of binding partner beads is associated with a specific biological particle and/or molecule.

105. The method of claim 104, further comprising: contacting the binding partner beads linked to biological particles and/or molecules with the addressable array to form a self-assembled array.

106. The method of claim 102, further comprising: contacting the crosslinked biological particles and/or molecules with the array to form the self-assembled array.

107. The method of claim 91, wherein the number of sets of conjugates is equal to the number of unique capture agents.

108. The method of claim 91, wherein the conjugates are chemical conjugates.

109. The method of claim 108, wherein the chemical conjugate is linked by an interaction selected from the group consisting of covalent, ionic, hydrophobic and van der Waals interactions; and

the interaction is sufficiently stable to maintain the conjugation of the conjugate upon binding to the capture agent.

110. The method of claim 91, wherein the conjugates are recombinant conjugates.

111. The method of claim 110, wherein the recombinant conjugate is a fusion protein.

112. The method of claim 91, wherein the capture agents comprise antibodies.

113. The method of claim 112, wherein the antibodies are monoclonal antibodies or fragments thereof that retain the ability to specifically bind to a binding partner.

114. The method of claim 91, wherein the binding partners comprise polypeptides.

115. The method of claim 108, wherein the chemical conjugates are prepared using one or more conjugation reagents, wherein the reagent

effects covalent linkage of a binding partner to a molecule or biological particle.

116. The method of claim 115, wherein the linkage effected by the conjugation reagent(s) is selected from the group consisting of thiol-thiol, thiol-amine, amine-amine, amine-carboxylic acid, thiol-carboxylic acid, thiol-carbohydrate and amine-non selective linkage.

117. The method of claim 112, wherein:

the capture agents comprise polyclonal antibodies;

the collection is addressed as loci on a solid support; and

each locus on the solid support comprises polyclonal antibodies specific for one binding partner.

118. The method of claim 112, wherein the avidity of the polyclonal antibodies for the binding partner at each locus is about 10^8 - 10^{12}.

119. The method of claim 91, wherein the capture agents and/or binding partners comprise scFvs.

120. The method of claim 113, wherein antibodies or fragments thereof are anti-peptide antibodies selected from the group consisting of an anti-E-tag antibody, an anti-FLAG M2 antibody, an anti-Glu-Glu antibody, an anti-HA.11 antibody, an anti-HSV-tag antibody, an anti-c-myc antibody, an anti-T7 tag antibody, an anti-VSV G antibody, an anti-V5 antibody, an anti-AB2 antibody, an anti-AB4 antibody, an anti-B34 antibody, an anti-P5D4 A antibody, an anti-P5D4 B antibody, an anti-4C10 antibody, an anti-AB3 antibody, an anti-AB6 antibody, an anti-KT3 A antibody, an anti-KT3 B antibody, an anti-KT3 C antibody, an anti-7.23 antibody, an anti-HOPC1 antibody, an anti-S1 antibody, an anti-E2 antibody, an anti-His tag antibody, an anti-AU1 antibody, an anti-AU5 antibody, an anti-IRS antibody, an anti-NusA antibody, an anti-MBP antibody, an anti-TBP antibody and an anti-TRX antibody.

121. The method of claim 112, wherein antibodies a comprise an antibody fragment that comprises a scFv.

122. The method of claim 114, wherein polypeptides are selected from the group consisting of an E-tag polypeptide (SEQ ID No. 1), a FLAG polypeptide (SEQ ID No. 2), a Glu-Glu polypeptide (SEQ ID No. 3), a HA.11 polypeptide (SEQ ID No. 4), a HSV-tag polypeptide (SEQ ID No. 5), a c-myc polypeptide (SEQ ID No. 6), a T7 tag polypeptide (SEQ ID No. 7), a VSV-G polypeptide (SEQ ID No. 8), a V5 polypeptide (SEQ ID No. 9), an AB2 polypeptide (SEQ ID No. 10), an AB4 polypeptide (SEQ ID No. 11), a B34 polypeptide (SEQ ID No. 12), a P5D4-A polypeptide (SEQ ID No. 13), a P5D4-B polypeptide (SEQ ID No. 14), a 4C10 polypeptide (SEQ ID No. 15), an AB3 polypeptide (SEQ ID No. 16), an AB6 polypeptide (SEQ ID No. 17), a KT3-A polypeptide (SEQ ID No. 18), a KT3-B polypeptide (SEQ ID No. 19), a KT3-C polypeptide (SEQ ID No. 20), a 7.23 polypeptide (SEQ ID No. 21), a HOPC1 polypeptide (SEQ ID No. 22), a s1 polypeptide (SEQ ID No. 23), an E2 polypeptide (SEQ ID No. 24), a His tag polypeptide (SEQ ID No. 25), an AU1 polypeptide (SEQ ID No. 26), an AU5 polypeptide (SEQ ID No. 27), an IRS polypeptide (SEQ ID No. 28), a KT3 polypeptide (SEQ ID No. 34), NusA (SEQ ID No. 29), Maltose binding protein (SEQ ID No. 30), TATA-box binding protein (SEQ ID No. 31) and thioredoxin (SEQ ID No. 32).

123. The method of claim 91, wherein the addressable collection is positionally addressable; and

each address comprises a spot on an a solid support.

124. The method of claim 123 that is a array.

125. The method of claim 123, wherein the solid support is selected from the group consisting of silicon, celluloses, metal, polymeric surfaces and radiation grafted supports.

126. The method of claim 124, wherein the solid support is selected from the group consisting of gold, nitrocellulose, polyvinyldiene fluoride (PVDF), radiation grafted polytetrafluoroethylene (PFTE), polystyrene, glass and activated glass.

127. The method of claim 123, wherein the solid support comprises a well or pit or plurality thereof in a surface of the solid support.

128. The method of claim 123, wherein the solid support is selected from the group consisting of plates, beads, microbeads, whiskers, combs, hybridization chips, membranes, single crystals, ceramics and self-assembling monolayers.

129. The method of claim 123, wherein the capture agents are attached to the solid support by a covalent bond, an electrostatic bond, a hydrogen bond or a combination thereof.

130. The method of claim 123, wherein the collections of capture agents are conjugated with biotin or a biotin derivative and the solid support is conjugated with avidin, streptavidin or a derivative thereof.

131. The method of claim 123, further comprising a linker between the collections of capture agents and the solid support.

132. The method of claim 131, wherein the linker is selected from the group consisting of oligopeptides, oligonucleotides, oligopolyamides, oligoethyleneglycerol, oligoacrylamides, alkyl chains of between about 6 to about 20 carbon atoms, and combinations thereof.

133. The method of claim 129, wherein the attachment is a cleavable attachment.

134. The method of claim 133, wherein the cleavable attachment is cleavable by an enzyme, a chemical agent or electromagnetic radiation.

135. The method of claim 134, wherein the chemical agent is selected from the group consisting of reducing agents, oxidizing agents, hydrolyzing agents and methods thereof.

136. The method of claim 134, wherein the electromagnetic radiation is selected from the group consisting of visible, ultraviolet and infrared radiation.

137. The method of claim 91, wherein the collection of capture agents are addressably tagged by linking them to electronic, chemical, optical or color-coded labels.

138. The method of claim 115, wherein the conjugation reagent is *m*-maleimidobenzoyl-N-hydroxysuccinamide ester (Sulfo-MBS).

139. The method of claim 91, wherein the molecule is a cyclic peptide.

140. A method for monitoring an interaction of an exogenous molecule and/or biological particle with a self-assembled array, comprising:

a) performing the method of claim 91;

b) contacting the exogenous molecule and/or biological particle to the self-assembled array; and

c) monitoring the interaction between the exogenous molecule and/or biological particle and the self-assembled array.

141. The method of claim 140, further comprising:

(d) adding a candidate compound or exposing the self-assembled array to a condition before, simultaneously with or after contacting the exogenous molecule and/or biological particle with the self-assembled array; and

(e) assessing an effect of the candidate compound or condition on the interaction between the exogenous molecules and/or biological particles and the self-assembled array to monitor or identify the effect of the candidate compound, condition or both on the occurrence of the events.

142. The method of claim 141, wherein the contacting and assessing are performed simultaneously or sequentially.

143. The method of claim 140, wherein the effect is selected from the group consisting of a change in structure, function, a physical change, a chemical or a morphological change, signal transduction, protein trafficking, gene expression, translation, the pattern (profile) of

captured molecules, degradation of a biopolymer in or on the biological particle, proliferation, cell death, apoptosis, morphological changes, gene expression, transcription, translation, receptor internalization, receptor shedding, receptor-mediated activation of the biological particle or a receptor thereon or therein, differentiation, dedifferentiation, interactions among biological particles, endocytosis, phagocytosis, exocytosis, phosphorylation, dephosphorylation and change in kinetics of an intra-particle reaction.

144. The method of claim 141, wherein the candidate compound is selected from the group consisting of an organic compound, an inorganic compound, a metal complex, a receptor, a ligand, an enzyme, an antibody, a protein, a nucleic acid, a peptide nucleic acid, DNA, RNA, a polynucleotide, an oligonucleotide, an oligosaccharide, a lipid, a lipoprotein, an amino acid, a peptide, a cyclic peptide, a polypeptide, a peptidomimetic, a carbohydrate, a cofactor, a drug, a prodrug, a lectin, a sugar, a glycoprotein, a biomolecule, a macromolecule, a biopolymer, a polymer, a sub-cellular structure, a sub-cellular compartment, a virus, a phage, a cell, a liposome, and a micellar agent.

145. The method of claim 141, wherein the condition is selected from the group consisting of a variation in buffer or solution components, pH, temperature, exposure to light, aerobic or anaerobic conditions, concentration of components, duration of experimental detection, ionic strength, pressure, agitation, and organic or aqueous interaction medium.

146. The method of claim 140, wherein the interaction is known.

147. A method of identifying a molecule that modulates trafficking in biological particles, comprising:

a) performing the method of claim 91;

b) contacting an exogenous biological particle to the self-assembled array;

c) monitoring trafficking in the exogenous biological particle,

to thereby identifying the conjugated molecule(s) from among the self-assembled array that modulate the trafficking in the exogenous biological particle.

148. A method of identifying an exogenous molecule that modulates trafficking in biological particles, comprising:

a) performing the method of claim 91;

b) adding a candidate compound or exposing the self-assembled array to a condition before, during or after contacting the self-assembled array with an exogenous biological particle; and

c) monitoring trafficking in the exogenous biological particle, to thereby identify the candidate compound(s) and/or condition(s) that modulate trafficking in the exogenous biological particle.

149. The method of claim 147, wherein the conjugated molecules or candidate compounds that modulate trafficking are selected from the group consisting of oligonucleotides, oligonucleosides, polypeptides, amino acids, nucleotides, nucleosides, peptide nucleic acids, oligosaccharides, monosaccharides, organic compounds, inorganic compounds, metal complexes, metal ions, lipids, lipoproteins, peptidomimetics, carbohydrates, cofactors, drugs, prodrugs, lectins, sugars, glycoproteins, biomolecule, macromolecule, biopolymer, polymer, sub-cellular structure, sub-cellular compartment or any combination, portion, salt, or derivative thereof.

150. The method of claim 149, wherein the polypeptides are selected from the group consisting of: enzymes, proteins, receptors, cellular adhesion molecules, antibodies and fragments thereof.

151. A method for identifying a molecule that modulates activity or functional or structural property in or of molecules and/or biological particles, comprising:

a) performing the method of claim 91;

b) contacting the self-assembled array with exogenous molecules;

c) monitoring the activity, function or structural property in or of the conjugated molecules and/or biological particles in the self-assembled array, to thereby identify the exogenous molecule(s) that modulate the activity, function or structural property in or of the conjugated molecules and/or biological particles in the self-assembled array.

152. A method for identifying a molecule that modulates an activity or functional or structural property in or of a conjugated molecule and/or biological particle in a self-assembled array, comprising:

a) performing the method of claim 91;

b) adding a candidate compound or exposing the self-assembled array to a condition before, during or after contacting the self-assembled array with exogenous molecules; and

c) monitoring the activity, function or structural property in or of the conjugated molecules and/or biological particles, to thereby identify the candidate compound(s) and/or condition(s) that modulate the activity, function or structural property in or of the conjugated molecules and/or biological particles in the self-assembled array.

153. The method of claim 151, wherein the activity, function or structural property are selected from the group consisting of proliferation, apoptosis, morphology, transcription, translation, receptor internalization, receptor shedding, signal transduction, receptor-mediated activation of a biological particle, receptor-activated signaling in a biological particle, differentiation, dedifferentiation, interactions among constituent proteins and/or protein complexes and components thereof, interactions among biological particles, endocytosis, phagocytosis, exocytosis, phosphorylation, dephosphorylation and change in kinetics of an intra-particle reaction.

154. A self-assembled array produced by a method of claim 91.

155. A self-assembled array, comprising:

a) an addressable array of capture agents that have predetermined binding partners; and

b) a plurality of sets of conjugates, wherein:

each set of conjugates comprises a biological particle and/or molecule linked to a binding partner or plurality thereof, wherein the binding partners are specifically bound to their capture agents.

156. The self-assembled array of claim 155, wherein the capture agents comprise antibodies.

157. The self-assembled array of claim 156, wherein the antibodies are monoclonal antibodies or fragments thereof that retain the ability to specifically bind to a binding partner.

158. The self-assembled array of claim 157, wherein the binding partners comprise polypeptides.

159. The self-assembled array of claim 155, wherein:

the capture agents comprise polyclonal antibodies;

the collection is addressed as loci on a solid support; and

each locus on the solid support comprises polyclonal antibodies specific for one binding partner.

160. The self-assembled array of claim 159, wherein the avidity of the polyclonal antibodies for the binding partner at each locus is about 10^8 - 10^{12}.

161. The self-assembled array of claim 155, wherein the capture agents and/or binding partners comprise scFvs.

162. The self-assembled array of claim 157, wherein the antibody or fragment thereof is an anti-peptide antibody selected from the group consisting of an anti-E-tag antibody, an anti-FLAG M2 antibody, an anti-Glu-Glu antibody, an anti-HA.11 antibody, an anti-HSV-tag antibody, an anti-c-myc antibody, an anti-T7 tag antibody, an anti-VSV G antibody, an anti-V5 antibody, an anti-AB2 antibody, an anti-AB4 antibody, an anti-B34 antibody, an anti-P5D4 A antibody, an anti-P5D4 B antibody, an anti-4C10 antibody, an anti-AB3 antibody, an anti-AB6 antibody, an anti-KT3

A antibody, an anti-KT3 B antibody, an anti-KT3 C antibody, an anti-7.23 antibody, an anti-HOPC1 antibody, an anti-S1 antibody, an anti-E2 antibody, an anti-His tag antibody, an anti-AU1 antibody, an anti-AU5 antibody, an anti-IRS antibody, an anti-NusA antibody, an anti-MBP antibody, an anti-TBP antibody and an anti-TRX antibody.

163. The self-assembled array of claim 159, wherein the polyclonal antibodies comprise an antibody fragment that comprises a scFv.

164. The self-assembled array of claim 158, wherein the polypeptide is selected from the group consisting of an E-tag polypeptide (SEQ ID No. 1), a FLAG polypeptide (SEQ ID No. 2), a Glu-Glu polypeptide (SEQ ID No. 3), a HA.11 polypeptide (SEQ ID No. 4), a HSV-tag polypeptide (SEQ ID No. 5), a c-myc polypeptide (SEQ ID No. 6), a T7 tag polypeptide (SEQ ID No. 7), a VSV-G polypeptide (SEQ ID No. 8), a V5 polypeptide (SEQ ID No. 9), an AB2 polypeptide (SEQ ID No. 10), an AB4 polypeptide (SEQ ID No. 11), a B34 polypeptide (SEQ ID No. 12), a P5D4-A polypeptide (SEQ ID No. 13), a P5D4-B polypeptide (SEQ ID No. 14), a 4C10 polypeptide (SEQ ID No. 15), an AB3 polypeptide (SEQ ID No. 16), an AB6 polypeptide (SEQ ID No. 17), a KT3-A polypeptide (SEQ ID No. 18), a KT3-B polypeptide (SEQ ID No. 19), a KT3-C polypeptide (SEQ ID No. 20), a 7.23 polypeptide (SEQ ID No. 21), a HOPC1 polypeptide (SEQ ID No. 22), a S1 polypeptide (SEQ ID No. 23), an E2 polypeptide (SEQ ID No. 24), a His tag polypeptide (SEQ ID No. 25), an AU1 polypeptide (SEQ ID No. 26), an AU5 polypeptide (SEQ ID No. 27), an IRS polypeptide (SEQ ID No. 28), a KT3 polypeptide (SEQ ID No. 34), NusA (SEQ ID No. 29), Maltose binding protein (SEQ ID No. 30), TATA-box binding protein (SEQ ID No. 31) and thioredoxin (SEQ ID No. 32).

165. The self-assembled array of claim 155, wherein the addressable collection is positionally addressable; and

each address comprises a spot on a solid support.

166. The self-assembled array of claim 165, wherein the solid support is selected from the group consisting of silicon, celluloses, metal, polymeric surfaces and radiation grafted supports.

167. The self-assembled array of claim 165, wherein the solid support is selected from the group consisting of gold, nitrocellulose, polyvinyldiene fluoride (PVDF), radiation grafted polytetrafluoroethylene, polystyrene, glass and activated glass.

168. The self-assembled array of claim 165, wherein the solid support comprises a well or pit or plurality thereof in a surface of the solid support.

169. The self-assembled array of claim 165, wherein the solid support is selected from the group consisting of plates, beads, microbeads, whiskers, combs, hybridization chips, membranes, single crystals, ceramics and self-assembling monolayers.

170. The self-assembled array of claim 165, wherein the collections of capture agents are conjugated with biotin or a biotin derivative and the solid support is conjugated with avidin, streptavidin or a derivative thereof, whereby the capture agents are linked to the support.

171. The self-assembled array of claim 165, wherein the capture agents are attached to the solid support by a covalent bond, an electrostatic bond, a hydrogen bond or a combination thereof.

172. The self-assembled array of claim 165, further comprising a spacer between the collections of capture agents and the solid support.

173. The self-assembled array of claim 172, wherein the spacer is selected from the group consisting of oligopeptides, oligonucleotides, oligopolyamides, oligoethyleneglycerol, oligoacrylamides, alkyl chains of between about 6 to about 20 carbon atoms, and combinations thereof.

174. The self-assembled array of claim 171, wherein the attachment is a cleavable attachment.

175. The self-assembled array of claim 174, wherein the cleavable attachment is cleavable by an enzyme, a chemical agent or electromagnetic radiation.

176. The self-assembled array of claim 175, wherein the chemical agent is selected from the group consisting of reducing agents, oxidizing agents, hydrolyzing agents and combinations thereof.

177. The self-assembled array of claim 175, wherein the electromagnetic radiation is selected from the group consisting of visible, ultraviolet and infrared radiation.

178. The self-assembled array of claim 155, wherein the collection of capture agents are addressably tagged by linking them to electronic, chemical, optical or color-coded labels.

179. A combination, comprising:

an addressable collection of capture agents;

a plurality of sets of binding partners, wherein each set of binding partners specifically binds to a unique capture agent; and

wherein the binding partner is linked to a linker or intermediate molecule; and wherein a displayed molecule and/or a displayed particle is attached to the linker or intermediate molecule.

180. The combination of claim 179, wherein the linker is selected from the group consisting of peptide linker, a chemical linker, and a cleavable linker.

181. The combination of claim 180, wherein the cleavable linker is selected from the group consisting of acid-cleavable, heat labile and photocleavable linkers.

182. The combination of claim 179, wherein the intermediate molecule is a bead.

183. The combination of claim 182, wherein the bead is linked to an electronic, chemical, optical, or color-coded label.

184. The combination of claim 179, wherein the linking of the binding partner to the linker or intermediate molecule comprises a

covalent bond, an electrostatic bond, a hydrogen bond, or a combination thereof.

185. The combination of claim 179, wherein the attachment of the displayed molecule and/or a displayed particle to the linker or intermediate molecule comprises a covalent bond, an electrostatic bond, a hydrogen bond, or a combination thereof.

186. A kit comprising the combination of claim 179 and one or more of the following:

(a) packaging material; and

(b) instructions for using the kit for preparation, use and/or analysis of self-assembled arrays.

187. A method of analyzing and/or processing a signal or plurality thereof at loci on an exposed positionally addressable array, comprising:

a) receiving image data corresponding to pixel luminosity information at the exposed locus within the positionally addressable array, wherein the locus comprises capture agents;

b) specifying pre-determined input parameters for processing the received image data that include parameters that specify a predetermined array locus or plurality thereof on a surface of the array;

c) determining an actual location of a locus or plurality thereof on the array; and

d) processing the image data for each exposed locus in accord with the determined actual locus and the input parameters.

188. The method of claim 187, wherein processing comprises determining or detecting luminosity at the actual locus on the array.

189. The method of claim 187, wherein a plurality of arrays are processed.

190. The method of claim 187, wherein determining the actual locus comprises:

processing image data that corresponds to pixels located a distance from a pre-selected locus such that luminosity information for the pixels indicates increasing values; and

recording an array location that corresponds to a local maximum of intensity values as the actual location of the locus.

191. The method of claim 187, wherein the pre-determined input parameters for processing the received image data that include parameters that specify all loci on the surface of the array.

192. A method for processing a signal or plurality thereof at loci that display a detectable signal in or on an array, comprising:

a) receiving image data corresponding to pixel luminosity information for locations for a plurality of the loci of the array;

b) for a particular locus of the array, determining neighbor luminosity effects on the image data for the particular locus that are produced from adjacent neighbor loci; and

c) compensating for the neighbor luminosity effects of the adjacent neighbor loci from the image data for the particular locus.

193. The method of claim 192, wherein a plurality of arrays are processed.

194. The method of claim 187, wherein the array is a self-assembled array.

195. A method of processing a signal or plurality thereof at loci on a positionally addressable array, comprising:

a) receiving image data corresponding to pixel luminosity information of the locations for a plurality of the loci of the array;

b) for a particular locus of the array, determining neighbor luminosity effects on the image data for the particular locus that are produced from adjacent neighbor loci; and

c) compensating for the neighbor luminosity effects of the adjacent neighbor loci from the image data for the particular locus.

196. The method of claim 195, wherein a plurality of arrays are processed.

197. The method of claim 195, wherein determining neighbor luminosity effects comprises:

determining a luminosity value corresponding to an illumination value for a location at each neighbor locus of the particular locus;

determining an actual location on the top surface of the canvas for each locus;

determining an array distance from the particular locus to each of the associated neighbor loci; and

compensating for the luminosity effects from each of the neighbor loci in accord with their respective distance to the particular locus.

198. The method of claim 197, wherein determining an actual location for each particular loci comprises:

processing image data that corresponds to pixels located a distance from each particular locus of interest such that luminosity information for the pixels indicates increasing values; and

recording an array location that corresponds to a local maximum of intensity values as the actual location of the particular locus of interest.

199. The method of claim 198, wherein determining the array distance comprises subtracting the determined actual locations of the particular locus to determine distances between the respective locations of the particular locus and the asssociated neighbor loci.

200. The method of claim 195, wherein the array is a self-assembled array.

201. A program product for use in a computer device that executes program instructions recorded in a computer-readable medium to perform a method for analyzing arrays that have loci that display a detectable signal in or on the array, the program product comprising:

a recordable medium; and

a plurality of computer-readable instructions executable by the computer device to perform a method comprising:

receiving image data corresponding to pixel luminosity information of the loci;

specifying input parameters for processing the received image data that include parameters that specify a predicted array location for each locus of the array,

determining an actual location for each locus;, and

processing the image data for each location in accord with the determined actual location and the input parameters.

202. The program product of claim 201, wherein determining the actual location comprises:

processing image data that corresponds to pixels located a distance from a locus such that luminosity information for the pixels indicates increasing values; and

recording an array location that corresponds to a local maximum of intensity values as the actual locus.

203. A program product for use in a computer device that executes program instructions recorded in a computer-readable medium to perform a method for processing an array with loci that display a detectable signal in or on the array, comprising:

a recordable medium; and

a plurality of computer-readable instructions executable by the computer device to perform the method comprising

receiving image data corresponding to pixel luminosity information of the loci for a plurality of the locations of the array,

for a particular locus in the array, determining neighbor luminosity effects on the image data for the particular location that are produced from adjacent neighbor locations, and

compensating for the neighbor luminosity effects of the adjacent neighbor locations from the image data for the particular location.

204. The program product of claim 203, wherein determining neighbor luminosity effects comprises:

determining a luminosity value corresponding to an illumination value for a biological material location at each neighbor location of the particular location;

determining an actual location on the top surface of the canvas for each biological material location;

determining an array distance from the location of the particular biological material to each of the associated neighbor locations;

compensating for the luminosity effects from each of the neighbor locations in accord with their respective distance to the location of the particular biological material.

205. The program product of claim 204, wherein determining an actual locus, comprises:

processing image data that corresponds to pixels located a distance from a locus such that luminosity information for the pixels indicates increasing values; and

recording the array location that corresponds to a local maximum of intensity values as the actual location of the biological material of interest.

206. The program product of claim 205, wherein determining the array distance comprises subtracting the determined actual locations of the biological locations to determine distances between the respective locations of the biological material and the neighbor locations.

207. An apparatus that processes data produced from imaging detectable loci on an array, comprising:

a computer processor that executes program instructions;

an input processor that receives input parameters for processing received image data, including input parameters that specify a predicted array location for each locus on the array, wherein the image data corresponds to pixel luminosity information for loci in the array;

an image analysis processor that determines an actual location on the array for each locus, and processes the image data for each location in accord with the determined actual location and the input parameters.

208. The apparatus of claim 207, wherein the image analysis processor determines the actual location by processing image data that corresponds to pixels located a distance from a particular locus such that luminosity information for the pixels indicates increasing values, and recording an array location that corresponds to a local maximum of intensity values as the actual location of the biological material of interest.

209. An apparatus that processes data produced from imaging detetable loci in an array, the apparatus comprising:

a computer processor that executes program instructions;

an input processor that receives image data comprising pixel luminosity information for loci in the array; and

an image analysis processor that determines neighbor luminosity effects on image data for a particular locus produced from adjacent neighbor locations, and that compensates for the neighbor luminosity effects of the adjacent neighbor locations from the image data for the particular location.

210. The apparatus of claim 209, wherein the image analysis processor determines neighbor luminosity effects by determining a luminosity value corresponding to an illumination value for a biological material location at each neighbor location of the particular locus, determining an actual location on a surface of the array for each detectable locus, determining an array distance from the location of the particular biological material to each of the associated neighbor locations, and compensating for the luminosity effects from each of the neighbor locations in accord with their respective distance to the location of the detectable locus.

211. The apparatus of claim 170, wherein the image analysis processor determines the actual location for each detectable locus by

processing image data that corresponds to pixels located a distance from each detectable locus such that luminosity information for the pixels indicates increasing values, and recording an array location that corresponds to a local maximum of intensity values as the actual location of the biological material of interest.

212. The apparatus of claim 211, wherein the image analysis processor determines the array distance by subtracting the determined actual locations of the biological locations to determine distances between the respective locations.

213. A system for analysis of a collection of self-assembled arrays, comprising:

an addressable collection of capture agents and binding partners, comprising sets of capture agents and binding partners, wherein a set of capture agents is selected to specifically bind to a set of binding partners with sufficiently high affinity to produce collections of self-assembled arrays;

a conjugation reagent, comprising a compound or molecule sufficient for the conjugation of the sets of binding partners to sets of molecules or biological particles;

a computer programmed with instructions for controlling and directing production of an image of the conjugated sets of molecules or biological particles displayed on the collections of self-assembled arrays; and

software for processing of image data produced by the collections of self-assembled arrays.

214. The system of claim 213 that is an automated system.

215. The system of claim 213, further comprising a microplate reader.

216. The system of claim 213, further comprising a charge coupled device (CCD) camera.

217. A combination, comprising:

a program product of claim 201;

an addressable collection of capture agents; and

a plurality of sets of binding partners, wherein each set of binding partners specifically binds to a unique capture agent

218. The combination of claim 217, further comprising;

either or both of:

one or more conjugation reagents, wherein the reagent effects covalent linkage of a binding partner to a displayed molecule and/or displayed biological particle; and/or

instructions for use of the addressable collection of capture agent and binding partners to prepare self-assembled arrays.

219. A combination, comprising:

the program product of claim 201;

an addressable collection of capture agents; and

a list setting forth the amino acid sequences that comprise the binding portion of polypeptide binding partners for each member of the collection of capture agents or setting forth sequences of nucleotides that encode the sequences of amino acids of binding partners that specifically bind to each member of the collection of capture agents.

220. A combination, comprising:

the program product of claim 201;

an addressable collection of capture agents;

a collection of sets of nucleic acid molecules, wherein:

the members nucleic acid molecules of each set encode all or a portion of a polypeptide binding partner;

the encoded polypeptide binding partner or portion binds to a capture agent; and

a conjugation reagent for linking the encoded polypeptides to molecules and/or biological particles.

221. The combination of claim 217, wherein the capture agents comprise antibodies.

222. The combination of claim 221, wherein the antibodies are monoclonal antibodies or fragments thereof that retain the ability to specifically bind to a binding partner.

223. The combination of claim 217, wherein the binding partners comprise polypeptides.

224. The combination of claim 217, further comprising one or more conjugation reagents, wherein the reagent effects covalent linkage of a binding partner to a molecule or biological particle.

225. The combination of claim 217, wherein:

the capture agents comprise polyclonal antibodies;

the collection is addressed as loci on a solid support; and

each locus on the solid support comprises polyclonal antibodies specific for one binding partner.

226. The combination of claim 225, wherein the avidity of the polyclonal antibodies for the binding partner at each locus is about 10^8 - 10^{12}.

227. The combination of claim 217, wherein the capture agents and/or binding partners comprise scFvs.

228. The combination of claim 222, wherein the antibodies or fragments thereof are anti-peptide antibodies selected from the group consisting of an anti-E-tag antibody, an anti-FLAG M2 antibody, an anti-Glu-Glu antibody, an anti-HA.11 antibody, an anti-HSV-tag antibody, an anti-c-myc antibody, an anti-T7 tag antibody, an anti-VSV G antibody, an anti-V5 antibody, an anti-AB2 antibody, an anti-AB4 antibody, an anti-B34 antibody, an anti-P5D4 A antibody, an anti-P5D4 B antibody, an anti-4C10 antibody, an anti-AB3 antibody, an anti-AB6 antibody, an anti-KT3 A antibody, an anti-KT3 B antibody, an anti-KT3 C antibody, an anti-7.23 antibody, an anti-HOPC1 antibody, an anti-S1 antibody, an anti-E2 antibody, an anti-His tag antibody, an anti-AU1 antibody, an anti-AU5 antibody, an anti-IRS antibody, an anti-NusA antibody, an anti-MBP antibody, an anti-TBP antibody and an anti-TRX antibody.

229. The combination of claim 225, wherein the antibody is a fragment that comprises a scFv.

230. The combination of claim 219, wherein the polypeptides are selected from the group consisting of an E-tag polypeptide (SEQ ID No. 1), a FLAG polypeptide (SEQ ID No. 2), a Glu-Glu polypeptide (SEQ ID No. 3), a HA.11 polypeptide (SEQ ID No. 4), a HSV-tag polypeptide (SEQ ID No. 5), a c-myc polypeptide (SEQ ID No. 6), a T7 tag polypeptide (SEQ ID No. 7), a VSV-G polypeptide (SEQ ID No. 8), a V5 polypeptide (SEQ ID No. 9), an AB2 polypeptide (SEQ ID No. 10), an AB4 polypeptide (SEQ ID No. 11), a B34 polypeptide (SEQ ID No. 12), a P5D4-A polypeptide (SEQ ID No. 13), a P5D4-B polypeptide (SEQ ID No. 14), a 4C10 polypeptide (SEQ ID No. 15), an AB3 polypeptide (SEQ ID No. 16), an AB6 polypeptide (SEQ ID No. 17), a KT3-A polypeptide (SEQ ID No. 18), a KT3-B polypeptide (SEQ ID No. 19), a KT3-C polypeptide (SEQ ID No. 20), a 7.23 polypeptide (SEQ ID No. 21), a HOPC1 polypeptide (SEQ ID No. 22), a S1 polypeptide (SEQ ID No. 23), an E2 polypeptide (SEQ ID No. 24), a His tag polypeptide (SEQ ID No. 25), an AU1 polypeptide (SEQ ID No. 26), an AU5 polypeptide (SEQ ID No. 27), an IRS polypeptide (SEQ ID No. 28), a KT3 polypeptide (SEQ ID No. 34), NusA (SEQ ID No. 29), Maltose binding protein (SEQ ID No. 30), TATA-box binding protein (SEQ ID No. 31) and thioredoxin (SEQ ID No. 32).

231. The combination of claim 217, wherein the addressable collection is positionally addressable; and

each address comprises a spot on a solid support.

232. The combination of claim 231 that is a array.

233. The combination of claim 231, wherein the solid support is selected from the group consisting of silicon, celluloses, metal, polymeric surfaces and radiation grafted supports.

234. The combination of claim 231, wherein the solid support is selected from the group consisting of gold, nitrocellulose, polyvinyldiene

fluoride (PVDF), radiation grafted polytetrafluoroethylene, polystyrene, glass and activated glass.

235. The combination of claim 231, wherein the solid support comprises a well or pit or plurality thereof in a surface of the solid support.

236. The combination of claim 231, wherein the solid support is selected from the group consisting of plates, beads, microbeads, whiskers, combs, hybridization chips, membranes, single crystals, ceramics and self-assembling monolayers.

237. The combination of claim 231, wherein the collections of capture agents are conjugated with biotin or a biotin derivative and the solid support is conjugated with avidin, streptavidin or a derivative thereof, whereby the capture agents are linked to the support.

238. The combination of claim 231, wherein the capture agents are attached to the solid support by a covalent bond, an electrostatic bond, a hydrogen bond or a combination thereof.

239. The combination of claim 231, further comprising a linker between the collections of capture agents and the solid support.

240. The combination of claim 239, wherein the linker is selected from the group consisting of oligopeptides, oligonucleotides, oligopolyamides, oligoethyleneglycerol, oligoacrylamides, alkyl chains of between about 6 to about 20 carbon atoms, and combinations thereof.

241. The combination of claim 238, wherein the attachment is a cleavable attachment.

242. The combination of claim 241, wherein the cleavable attachment is cleavable by an enzyme, a chemical agent or electromagnetic radiation.

243. The combination of claim 242, wherein the chemical agent is selected from the group consisting of reducing agents, oxidizing agents, hydrolyzing agents and combinations thereof.

244. The combination of claim 242, wherein the electromagnetic radiation is selected from the group consisting of visible, ultraviolet and infrared radiation.

245. The combination of claim 217, wherein the collection of capture agents are addressably tagged by linking them to electronic, chemical, optical or color-coded labels.

246. The combination of claim 220, wherein the linking effected by a conjugation reagent(s) selected from the group consisting of thiol-thiol, thiol-amine, amine-amine, amine-carboxylic acid, thiol-carboxylic acid, thiol-carbohydrate and amine-non selective linkage.

247. A kit comprising the combination of claim 217 and one or more of the following:

(a) packaging material; and

(b) instructions for using the kit for preparation, use and/or analysis of self-assembled arrays.